

## TBD08 – (Part 08) Nucleic Acids

Name \_\_\_\_\_

1. B.8.1 **Describe** the structure of nucleotides and their condensation polymers (nucleic acids or polynucleotides). (2) *Nucleic acids are polymers made up of nucleotides. A nucleotide contains a phosphate group, a pentose sugar and an organic nitrogenous base. Students should recognize, but do not need to recall, the structures of the five bases: adenine (A), cytosine (C), guanine (G), thymine (T) and uracil (U). Nucleic acids are joined by covalent bonds between the phosphate of one nucleotide and the sugar of the next, resulting in a backbone with a repeating pattern of sugar–phosphate–sugar–phosphate. Nitrogenous bases are attached to the sugar of the backbone.*

- a. All nucleotides (DNA and RNA both) are made of three parts, report on all three:

	Description	Drawing
Phosphate		
Pentose Sugar		
Nitrogenous Base		

- b. How is a nucleotide formed? Draw the process briefly:

2. B.8.2 **Distinguish** between the structures of DNA and RNA. (2) *RNA has ribose as its pentose sugar; DNA has deoxyribose. Deoxyribose lacks an oxygen atom on C2. RNA has uracil instead of thymine as its base. RNA is a single-strand nucleic acid; DNA is a doublestrand nucleic acid.*

	DNA	RNA
Description, Structure, etc		

3. B.8.3 **Explain** the double helical structure of DNA. (3) *The structure has two nucleic acid strands that spiral around an axis. Students should describe the hydrogen bonding between specific pairs of nucleotide bases.*

- a. Describe, using drawings if necessary, the helical structure of DNA (where each component is oriented) etc:

- b. Which bases pair with which bases? THIS IS VERY IMPORTANT!!

- c. Explain what happens in DNA replication:

4. B.8.4 **Describe** the role of DNA as the repository of genetic information, and explain its role in protein synthesis. (2)  
*DNA is the genetic material that an individual inherits from its parents. It directs mRNA synthesis (transcription) and, through mRNA, directs protein synthesis (translation) using a triplet code.*
- Protein synthesis occurs in two steps, what are they?
  - Describe the first step of protein synthesis:
  - Describe the second step of protein synthesis:
  - What is the triplet code for proteins? What is a codon? Why are there 64 options for codons?

5. B.8.5 **Outline** the steps involved in DNA profiling and state its use. (2) *Aim 8: Include forensic and paternity cases.*

01.

02.

03.

04.

05.

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08.

Explain how the 4 are related using the DNA X-ray film:

